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**SPAIN'S POTENTIALITIES IN WESTERN DEFENSE AS A BASE AREA
FOR TACTICAL OPERATIONS OR AS A NATURAL BASTION
(Contribution to NIE-34)**

1. Introduction and Summary.

Because of its location, control of the Iberian Peninsula or denial of its facilities to the USSR is of primary importance in planning for Western defense. The Peninsula, as a base of military operations, dominates the narrow Strait of Gibraltar, the air and sea lanes of the western Mediterranean, and the normal air and sea routes connecting Western Europe with South America and Africa.

The Iberian Peninsula is roughly square in shape and about equal in area to the states of Washington, Oregon, and Idaho combined. There are approximately 28 million people in Spain (which occupies five-sixths of the total area of the Peninsula), about 8½ million in Portugal, 24,000 in Gibraltar, and 5,000 in the small Spanish-speaking Republic of Andorra. The Iberian Peninsula is relatively inaccessible to attack. It is bordered by seas except along its 431-mile land boundary with France, where the Pyrenees provide a formidable natural barrier. Access via the coast is difficult because of the paucity of good harbors or landing areas. Access through the Pyrenees is limited to a small number of passes.

Within the Iberian Peninsula five areas are of key strategic importance: (a) Lisbon, as the transportation, telecommunication, and administrative center of Portugal; (b) Madrid, as the transportation, telecommunication, and administrative center of Spain; (c) Barcelona, for its commercial and industrial activity; (d) the Bilbao-San Sebastián area, for its industry and mining; and (e) Gibraltar. The five key strategic land and sea routes that provide access to the interior of the Iberian Peninsula are: (a) along the coast at the west end of the Pyrenees, (b) along the coast at the east end of the Pyrenees, (c) from the port of Lisbon and the Tejo Valley to Spain via Badajoz, (d) from ports at the northwest and southeast ends of Las Marismas Swamp to the Meseta via the Guadalquivir Valley, and (e) from the port of Tarragona and its vicinity to the Meseta via the Ebro Valley.

As a base for tactical operations, Iberia is closer to air targets in Western Europe than are bases in North Africa. Although there are numerous airfields in the Peninsula, few are currently suitable for large-scale air

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activity. Facilities, however, could be enlarged or new facilities constructed. Similarly, present port facilities and naval bases are inadequate but could be further developed. Unskilled labor sufficient for construction work is readily available. Among the disadvantages involved in the use of Iberia as a tactical base are rugged terrain, shortage of adequate internal road and railroad routes and facilities, seasonal power deficiencies, and possibility of water-supply shortages in summer.

In event of a defeat of NATO forces north of the Pyrenees, the Iberian Peninsula provides a natural bastion. The rugged nature of the terrain would be of great assistance in facilitating defense against land attack. On the north the Pyrenees provide a natural defense line that is difficult to breach except in the coastal areas at the extreme east and west. A successful invasion by way of these coastal routes would be difficult to accomplish without sea and air control. Internal supply lines in Iberia, however, could easily be interrupted because the small number of roads and railroads, built with an unusually large number of bridges and tunnels, makes them particularly vulnerable to attack.

2. Environmental Factors Involved.

a. Terrain.

Iberia is a rugged peninsula with an elevation averaging about 2,000 feet. The Meseta, the large central plateau, is bordered by rugged mountains on all sides except the west, where the edge of the Meseta is cut by steep valleys. Consequently, cross-country movement in virtually all parts of the Peninsula is hampered by the terrain. To the north of the Meseta are the Cordillera Cantábrica and Pyrenees; to the east, the Sierra de Guenca and coastal ranges, and to the south, the Sierra Morena and Sierra Nevada (see accompanying map, CIA 11939). The Meseta itself is divided into two parts by the Sierra de Guadarrama and Sierra de Gredos, which rise to an average of 2,500 feet above the general level of the plateau. Since so much of the Iberian Peninsula is mountainous, it is well-suited to guerrilla warfare.

The Pyrenees along the one land frontier provide a natural defense line. They attain a maximum width of 87 miles in the middle section, where the mountains rise to heights of 11,000 feet. The narrow coastal corridors at each end of the Pyrenees could be more easily breached than the passes in the central sections, especially if the defenders did not have complete air and sea control. In addition to the two coastal corridors, through railroads and roads from France to Spain cross the Pyrenees at only two points -- Puerto del Somport, which is over 5,000 feet above sea level, and the Puigcerda Pass at 3,700 feet. From a military point of view the coastal routes are easier to cross, since the two interior passes are blocked by snow from 4 to 6 months each year. Six other roads, five of which are of only minor importance, cross the Pyrenees.

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The Ebro Basin in the northeast and the Guadalquivir, or Andalusien, Lowlands in the south are the only two important plains in the Iberian Peninsula. In addition to parts of the Meseta and of the interrupted coastal lowlands, terrain favorable for the employment of mechanized equipment occurs only in these two plains areas.

The Iberian coastline in general is not favorable for landing operations. Most of the north coast is steep and rocky, with the formidable Cordillera Cantábrica immediately inland. The west coast of Spain contains a number of good harbors, but they are backed by steep slopes rising to a hilly plateau. In northern Portugal the coast is low and sandy, and the coastline is almost straight; along the southern half of the coast, cliffs alternate with low, sandy beaches. Similar coastal conditions continue along the southern coast of Spain as far east as Gibraltar. Immediately inland, Las Marismas Swamp provides a barrier to land movement. From Gibraltar eastward to Cartagena, mountains reach the sea in many places, and beaches in this section are relatively few and isolated. The east coast north of Cartagena contains few harbors but is highly varied in character, including long sandy beaches, irrigated areas, cliffs, and hills.

The most favorable approaches to the Iberian Peninsula from the sea would involve landings either in Portugal or southwestern Spain. In this area are Lisbon, which is the best-developed port of the Peninsula, numerous smaller ports, and a number of points at which amphibious landings could be made with relative ease. Access to the Meseta is slightly more feasible from the southwest coast than from other coasts, but the terrain along the Spanish-Portuguese border is rugged, and contact between the two countries is limited. A secondary area for approach by sea is provided by several landing points along the east coast between Barcelona and Cartagena. This coast might be selected by an enemy force in order to by-pass the Pyrenees. Despite the lack of good harbors and the presence of coastal mountains suitable for defensive action, a beachhead established at some point such as Tarragona would partially cut off Barcelona and would be a threat to air and supply bases in the Ebro Basin.

b. Climate and Weather.

The climate of most of the Iberian Peninsula, like that of Southern California or Italy, is characterized by hot, dry summers (April-November) and cool, wet winters (December-March). The chief exception to this generalization is the northwestern coast, where the weather is cool and damp virtually the year round. Rainfall is heaviest in the northwestern part of the Peninsula and lightest in the southeastern part.

Violent downpours occur during the winter, when swollen streams become barriers; the ground becomes muddy; and rain, heavy cloud cover, low ceilings, and icing conditions hamper flying. In the summer, with little or no rain, the ground becomes dry and firm, and streams are fordable. Cloud cover is

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light, and flying conditions are generally excellent. Toward the end of the summer, however, blowing dust becomes a nuisance, and shortages of water supply and power are a problem.

Temperature extremes are greater in the interior of the Peninsula than on the coast. In winter, below-freezing temperatures and snow occur in mountain regions and higher portions of the Meseta. Summers are hot and sunny, especially in August, but humidity is usually low. Troops would suffer less from heat in summer than from damp cold in winter. In general, the summer weather is considerably more favorable than the winter weather for military action.

An extensive net of meteorological observation stations is operated under the Spanish Ministry of Air. Forecasts are made with a fair degree of accuracy, despite lack of adequate equipment and communications. In Portugal, weather forecasts are made by the National Meteorological Service (similar to the US Weather Bureau), the Army Meteorological Service, and the Navy (at Aveiro). Portuguese forecasters, in both civil and military services, depend upon US personnel for guidance and leadership. In both Spain and Portugal, forecasters at the larger airfields usually give better forecasts than those at less important stations.

c. Water Supply, Vegetation, and Soils.

Water is a critical factor in the Iberian Peninsula. Two aspects are of particular strategic significance -- water supply for drinking and water supply for hydroelectric power.

The procurement of an adequate water supply would present a problem in parts of central and southern Spain, particularly in the area of La Mancha. For example, there are numerous stretches of dry country where water for the use of railway locomotives has always been in short supply. Only five provincial capitals -- Bilbao, Castellón, Madrid, Zaragoza, and Zamora -- have a water supply adequate to provide an average of 200 liters per capita daily for the present population.

In the Iberian Peninsula, hydroelectric power is extremely important, since coal deposits are of inferior quality and insufficient in quantity for domestic requirements and since petroleum production is nonexistent in Portugal and insignificant in Spain. Hydroelectric power, however, is subject to the fluctuations of climate and exposed to damage by aerial attack. Power facilities in both Spain and Portugal are currently incapable of meeting domestic needs.

Approximately 10 percent of Spain and 19 percent of Portugal are forested. Much of the remainder of the nonagricultural land is brush-covered or is grassland or semidesert. Small timbers of the type usable for pit-props are available in northern Portugal and northwestern Spain. Other lumber, as well as wood pulp and paper, must be imported.

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Some stands of conifers in the higher mountains are dense enough to provide year-round concealment for troops. The Pyrenees are more heavily forested on the French side than on the Spanish. Hardwoods such as oak, beech, and chestnut would provide concealment in northern Portugal and northwestern Spain during the summer. An inferior type of year-round concealment is provided in the south and southeast by a mixture of live oak, cork oak, and olive. The unforested area not in crops is usually covered by esparto grass or maquis, which provide little in the way of concealment.

Slope, rather than soil and lithology, would be the most critical factor for movement of troops because of the rugged terrain of much of the Iberian Peninsula. Rock and gravel for road building and airfield construction are usually easily obtained. Existing cement-making facilities could be utilized and expanded. Areas of alluvium, loose sand, and coastal swamps and areas subject to flood are relatively small and scattered over the Peninsula, so that they can be avoided by troops.

d. Transportation and Telecommunications.

(1) Highways.

The highways of Spain are not adequate for modern military traffic. The Spanish highway system radiates from Madrid, and good connecting roads in outlying areas are few. The deficiency is particularly important in the Pyrenees, where the Spanish roads are poor. On the French side of the border the network of roads is much better.

Among the obstacles encountered in Spain are weak or narrow bridges, narrow streets through towns, overhanging balconies, sharp curves, steep grades, switchbacks, tunnels, and a lack of alternative routes. Road construction is at a standstill, and maintenance of existing roads is inadequate. Furthermore, Spain lacks the means to buy asphalt and road-building machinery.

There is also a shortage of motor vehicles, tires, parts, and gasoline. The majority of vehicles in use are over 10 years old, and both passengers and freight move primarily by railroad.

The highways and vehicles of Portugal are in better condition than those of Spain. In Portugal a considerable amount of new road construction is in progress, maintenance is better, and vehicles in general are more modern. An outstanding deficiency is the lack of a bridge over the Rio Tejo in the Lisbon vicinity. Numerous obstacles in Portugal, such as narrow bridges, narrow roads, and the lack of alternative routes, make heavy military movements difficult.

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(2) Railroads.

The railroads of the Iberian Peninsula are unquestionably the worst in Western Europe. The railroads of Spain are in exceptionally bad shape, steady deterioration having taken place since 1930. The basic rail nets of both Spain and Portugal have 5-foot-6-inch gauge as compared with the 4-foot-8½-inch gauge in the US and France. A number of narrow-gauge lines are of local importance in both Spain and Portugal.

The broad-gauge Spanish railroad system centers on Madrid and connects all the main cities with the capital (see accompanying map, CIA 11939). However, no line is double-tracked for the entire distance from Madrid to any seaport. Sections of rail routes have been electrified, partly because of the shortage of good coal.

Railroad construction in Spain is difficult because of the rugged terrain. The numerous tunnels, sharp curves, frequent steep gradients, poor roadbeds, and old and inadequately maintained rolling stock make fast train operations impossible. Signals are inadequate, the supply of all kinds of equipment is insufficient, freight cars are in most cases without brakes, hotboxes are common, and ties are old and rotten. As a result, accidents are numerous. Bridges are in such poor condition that trains must often slow down to a crawl. The system cannot handle present peacetime traffic adequately, and freight is constantly backlogged. Spain needs to import finished railway equipment specially designed to fit the broad gauge, steel for domestic railway equipment production, ties, and coal.

The railroads of Spain are highly vulnerable to air attack and sabotage because of the many tunnels and bridges and the lack of alternative routes. Defense of the Pyrenees would be a serious problem from the point of view of the present railroad capabilities. In 1947 the withdrawal of 60,000 Spanish troops from the Pyrenees required 3 months' time and to a large extent disrupted normal railway traffic. The difference in gauge between the French and Spanish railroads necessitates transfer of goods at the border.

The railroads of Portugal are in better condition than those of Spain, but even there deterioration of rolling stock and fuel shortages are serious. Competition by highway buses and trucks has increased more rapidly in Portugal than in Spain. In Portugal, however, railroads are able to move freight more promptly than in Spain. Although the domestic railway-equipment industry is insignificant, Portugal is in a better position than Spain to make purchases abroad.

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(3) Civil Airports.

The economies of Spain and Portugal have not encouraged the extensive development of civil aviation. Airport development programs, however, have progressed in both countries. Other than military aircraft, the only significant use of airports is by Iberia (the Spanish national airline), the smaller Aviación y Comercio (Spanish), Transportes Aéreos Portugueses, Aero Portuguesa, and various foreign airlines serving the major cities. All pilots of Iberia are reserve or active commissioned officers in the Spanish Air Force. Commercial equipment is mostly US-manufactured.

The best airports are those at Madrid, Lisbon, Barcelona, Seville, Gibraltar, Valencia, Oporto, Cartagena, and Salamanca. Many other cities have airports suitable for small aircraft, which could be improved for use by combat planes. Among the major deficiencies are lack of air traffic control systems, inadequacy of beacons, and shortage of trained communications personnel. Lisbon, Madrid (Barajas), Barcelona, and Seville airports are equipped to handle night landings and are suitable for limited use by medium bombers and jet fighters.

(4) Inland Waterways.

The rivers of the Iberian Peninsula contribute very little to the transportation network because of their steep gradients, shifting channels, seasonal variations in flow, and the primary use of water for irrigation and power purposes.

The Guadalquivir River is the most important inland waterway, being navigable to Seville by ocean-going vessels. The Guadiana River is navigable for 28 miles to the copper pyrite shipping port of Pomarao by ships up to 3,000 tons requiring a minimum depth of 16 feet. Other rivers are used very little for transportation, except for access to a few ports (such as Huelva and Bilbao), which are located a short distance inland from the coast. In most cases the rivers merely provide obstructions to be overcome in road and railroad construction. For example, the Rio Tejo, with its wide estuary, marshy southern bank, and narrow gorge near the Spanish frontier, is a serious obstacle to land transportation between northern and southern Portugal. In the case of the Ebro in Spain, a very shallow river mouth; numerous sandbanks; a deep, almost impassable gorge 30 miles long in its lower course; and diversion of its water for irrigation purposes make navigation impractical.

(5) Seaports.

Most ports in the Iberian Peninsula have artificial harbors and poor inland communications. The harbors are open to sea and air attack, and port entrances are vulnerable to sea mines. Fueling facilities are often

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inadequate. In general, Iberian ports are not being used to full capacity. Further expansion would be possible because of the availability of manpower for construction and of harbor sites that could be developed.

In the event of military operations, the use of existing ports could be increased and port facilities expanded. Initially, at least, the inadequate inland transportation facilities would be a serious handicap to effective port utilization.

The major ports of the Iberian Peninsula are Lisbon, Bilbao, El Ferrol, Vigo, Oporto, Huelva, Seville, Cádiz, Algeciras, Gibraltar, Málaga, Cartagena, Alicante, Valencia, Barcelona, and Palma. Cartagena (which is the only good natural harbor on the east coast), Gibraltar, Cádiz, El Ferrol, and Palma are naval bases and would probably be less vulnerable to attack than the major commercial ports.

Among minor ports the harbors with best natural protection are found in northwestern Spain between El Ferrol and Vigo. Setúbal in Portugal has a large natural harbor that could be developed to supplement the port of Lisbon.

Limited facilities for shipbuilding are available at a few ports in the Iberian Peninsula, particularly Bilbao. Such activities are at present hampered by lack of means to import or manufacture certain essential equipment, such as metal parts and engines.

(6) Telecommunications.

Telecommunications are considered to be in better operation condition than any other public services in Spain. Over-all telephone facilities, which were the property of the International Telephone and Telegraph Corporation prior to purchase by the Spanish Government in 1945, are better than in France or Portugal and better than telegraph facilities within Spain. Integration among telephone, telegraph, and radio is poor throughout the Iberian Peninsula. Service would be seriously hampered by the destruction of Madrid and Lisbon.

Radio broadcasting stations are found in most Spanish cities, Radio Madrid and Radio Barcelona being the most important. Lisbon is the main center of radio broadcasting activities in Portugal.

e. Concentrations of Population.

In density the population of the Iberian Peninsula is about equal to that of New England but varies greatly from one part of the Peninsula to another. In general, population is most dense and urban concentrations are most numerous near the seacoast, Madrid being the one major exception. The population density is lowest in an area extending from the Pyrenees through the Ebro Basin and Sierra de Guadalupe to the semiarid La Mancha.

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In addition to the city of Madrid, the five areas of densest population are (1) Barcelona and vicinity, (2) the Valencia-Alicante area, (3) the Málaga-Cádiz area, (4) the Atlantic coast from Lisbon to El Ferrol, and (5) the Bilbao-San Sebastián area. The three largest cities are Madrid (approximately 1,400,000), Barcelona (approximately 1,250,000), and Lisbon (approximately 800,000).

In terms of numbers the Iberian Peninsula can supply a sizable labor force, but trained technicians and skilled labor are in short supply. By temperament the Portuguese are better able to deal easily with strangers than are the Spaniards.

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